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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,757	03/31/2004	Philip Derbeko	RADSA 21.075 (101120-0005)	5259
26304	7590	09/21/2006	EXAMINER	
KATTEN MUCHIN ROSENMAN LLP 575 MADISON AVENUE NEW YORK, NY 10022-2585			PATEL, KAUSHIKKUMAR M	
			ART UNIT	PAPER NUMBER
			2188	

DATE MAILED: 09/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/813,757	Applicant(s) DERBEKO, PHILIP	
	Examiner Kaushikkumar Patel	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 5, 7, 9-14, 16-18, 22, 24, 26-31, 33-40, 42, 43, 45, 46, 49 and 50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 7, 9-14, 16-18, 22, 24, 26-31, 33-40, 42-43, 45-46 and 49-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This office action is in response to applicant's communication filed July 05, 2006 in response to PTO office action mailed April 05, 2006. The applicant's remarks and amendments to the claims were considered with the results that follow.

2. In response to last office action, claims 1, 7, 9-10, 12-13, 16, 18, 24, 26-27, 29-30, 33, 35, 40, 45-46 and 49-50 have been amended. Claims 2-4, 6, 8, 15, 19-21, 23, 25, 32, 41, 44 and 47-48 have been canceled. No claims have been added. As a result, claims 1, 5, 7, 9-14, 16-18, 22, 24, 26-31, 33-40, 42-43, 45-46 and 49-50 remain pending in this application.

Response to Arguments

3. Applicant argues that Lam et al (US 2005/0172092) teaches method for generating backup of data stored in primary storage device. Examiner respectfully disagrees with the statement. Lam teaches generating backup of primary device but also teaches making backup using differential snapshot method. (Lam, pars. [0010] and [0011], taught as "during a delta replication, a snapshot of the data stored on the primary system is often performed", par. [0070], "to mitigate the risk that data on primary system 130 may become corrupted during delta replication, storage manager performs snapshot of data stored on primary storage system 130").

4. Applicant argues that Armagau does not disclose or suggest copying data from journal to production volume, but Armagau teaches use of disc cache and data received

Art Unit: 2188

from hosts are initially stored in the disk cache to reduce disk accesses and data read requests are also first checked with cache (col. 10, line 50 – col. 11, line 10). Applicant further argues about Shimozono and Serizawa not teaching about cache. Examiner respectfully disagrees with this. As per Shimozono, the virtualization switch includes an NVRAM, ROM and CPU for storing programs, mapping information and data to perform virtualization of SAN and also accepts the commands sent by hosts and transfers data to appropriate storage device (Shimozono, fig. 2, paragraphs [0047]-[0071]). Serizawa also discloses the virtualization switch with memory and input, output queues to hold requests sent from users (Serizawa, fig. 2 and related description from paragraphs [0057]-[0083]), and these references are included to provide benefits of virtualization switches in the networks and such switches can be programmed to perform various functions.

5. Applicant's further arguments with respect to claims 1-50 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 5, 7, 9-11, 18, 22, 24, 26-28, 35-38 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam et al. (US 2005/0172092 A1) and

Applicant's Admitted Prior Art (incorporating Armangau (US 6,434,681 B1)) (AAPA herein after).

As per claim 1, Lam teaches a method for enabling the execution of at least an I/O operation by at least a host on at least a production storage element while providing a snapshot copy of a said production storage element (fig. 1, client may transmit to primary storage system one or more data write commands, paragraph [0031], to mitigate the risk that data on primary system 130 may become corrupted during delta replication, storage manager performs snapshot of data stored on primary storage system, par. [0070]), said method comprises the steps of:

a) performing on-line a write request initiated by said host by writing a data chunk to a journal (storage manager receives from client a data write command containing a data item and inserts the data item into staging device (journal), although Lam does not explicitly teach on-line, it is inherent in the system of Lam the write task is performed and the data is stored in the staging device and host is acknowledged of write completion is equivalent to on-line write, paragraphs [0052] and [0060]);

b) generating a response message ending the execution of said write request and thereby handling said host to execute said I/O operations (storage manager transmits a write complete message to the client, paragraphs [0052] and [0060]); and

c) off-line producing said snapshot copy of said production storage element (during a delta replication, a snapshot of the data stored on the primary system is often performed" paragraph [0070], while a delta replication is being performed, storage manager may continue to receive and process data write commands from clients,

Art Unit: 2188

however delta table is unavailable during this time the storage manager may write data in staging device, these statements clearly indicates that data write commands are handled while snapshot of primary device is being performed. paragraph[0072]).

Lam teaches creating a snapshot of primary storage device while data is updated in primary storage device (paragraphs [0010], [0011] and [0070], also well known according to AAPA to reduce risk of original data being corrupted or lost), but fails to teach creating an updated snapshot of primary device. AAPA teaches method of “save changes” and “copy old on write” using lookup tables to update snapshot storage device (AAPA paragraphs [0006]-[0012]).

It would have been obvious to one having ordinary skill in the art at the time of the invention would have utilized an updated snapshot method as taught by AAPA in the system of Lam to reduce the latency of storage system because by copying only modified data since last snapshot was taken reduces the amount of data needed to copy from primary storage to snapshot storage.

As per claim 5, Lam teaches staging device as non-volatile memory (paragraph [0035]).

As per claim 7, Lam teaches performing on-line said write request further comprises the step of:

saving a destination address designated in said write request in a changes table (paragraphs [0043] and [0052], taught as segment table stores metadata contained in write command, metadata contains information pertaining data identifying information).

Claims 18 and 35 are rejected under same rationales as applied to claim 1 above (Lam teaches method can be performed by programmed processors executing blocks, par. [0099]).

Claims 22 and 39 are rejected under same rationales as applied to claim 5 above.

Claims 24 and 49 are rejected under same rationales as applied to claims 1 and 7 above.

As per claims 9 and 26, Lam teaches a method wherein off-line producing said updated snapshot copy with respect to claims 1, 7, 18 and 24 above. Lam teaches copying modified data from staging storage device to primary volume (paragraph [0053]), Lam fails to teach checking of data chunk to see if data chunk is modified since last snapshot and if the data chunk is not modified than copying data chunk from production volume to snapshot volume. Armangau (AAPA) teaches checking of data chunk to see if data chunk is modified since last snapshot and if data chunk is not modified than copies data chunk from production volume to snapshot volume (see Armangau, column 2, lines 12-34).

Art Unit: 2188

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Lam's storage system by teachings of Armangau to check the data chunk for modification and copying data from primary to snapshot volume by doing one can restore the previous data from snapshot volume if there is any fault or interruption in system and also one can create point-in-time backup copies.

As per claims 10, 11, 27 and 28, Lam teaches metadata of data item, which contains identification for assigned data block storage location (paragraph [0031]) and converting logical address to physical address (paragraph [0043]).

As per claims 36, 37 and 38, Lam teaches that primary and backup devices with disks (paragraph [0032]) and virtual drives (paragraph [0042]), thus Lam inherently teaches storage elements with disk and either physical or virtual volumes. Lam fails to teach tape libraries but uses of tape libraries as backup devices and RAID for data redundancies are well known in the art and Examiner takes official notice of that.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2188

9. Claims 12-14, 16-17, 29-31, 33-34, 40, 42-43, 45-46 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam et al. (US 2005/0172092 A1) and AAPA as applied to claims 1, 5, 7 and 9-11 above and further in view of Shimozono et al. (US 2005/0025045 A1) and Serizawa et al. (US 2005/0076157 A1)

As per claims 12-14 and 16-17, Lam teaches a method to perform on-line a primary task of write operation as taught with regards to claims 1, 18 and 35 above, but fails to teach read operation. With respect to claim 12-14 and 16-17, the read operation is similar well known concept of journal working as a cache for host, where user stores data (modified with write request during snapshot process) temporarily in the journal (cache) and accesses the data (during read request) from the journal (cache) if data is in the journal (cache) and if data is not present in the journal (cache) then it is retrieved from the production storage and sent to host.

It would have been obvious to one having ordinary skill in the art at the time of the invention would have used read request directed towards primary storage to staging storage device during snapshot process and sending the data to user read request if data is in the staging device and not waiting for completion of ongoing snapshot process and hence improving overall performance.

As per claim 14, Lam teaches storing metadata related to write request identifying the data block (paragraph [0052]). It would have been obvious to one having ordinary skill in the art at time of the invention to look for segment table to find if data

Art Unit: 2188

chunk requested resides in the staging device, and if data is in the staging device than sending the data from location of staging device to host.

As per claims 16 and 17, Lam teaches write command with data identifier as explained above in claim 10 and performing logical to physical address conversion in case of virtual volume as per claim 11 above. It is inherent feature of read request to include source address of the data block to be read.

Claims 29-31, 33-34, 40, 45-46 and 50 are also rejected under same rationales as applied to claims 1, 5, 7, 9-14 and 16-18, 22, 24, 26-28, and 35-37 above.

As per claim 42, Lam fails to teach storage controller, but he teaches storage manager to control data paths to and from host devices to storage disks and further teaches storage manager can be implemented using software and hardware (paragraph [0032]). It is well known in the art storage controllers performing data flow operations and virtualization operations.

As per claim 43, Lam fails to teach virtualization switch in storage area network (SAN). Shimozone and Serizawa teach use of virtualization switch (see fig. 1, abstract) in SAN to perform virtualization. It would have been obvious to one having ordinary skill in the art at the time of the invention to use virtualization switch as taught by Shimozone and Serizawa in system of Lam to improve system performance by redundancy in

Art Unit: 2188

access paths to storage devices (See Shimozono, paragraphs [0009]-[0015]) and to provide dynamic storage configuration (see Serizawa, paragraphs [0007]-[0011]).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Keohane et al. (US 2004/0260894 A1) teaches performing point-in-time backup using differential data blocks and temporary storage.

Yamagami (US 2004/0268067 A1) teaches journal volume and creating point-in-time backup using primary and journal data.

Teoman et al. (US 6,463,509 B1) teaches large capacity non-volatile storage media used as user cache to perform faster I/O operations.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2188

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

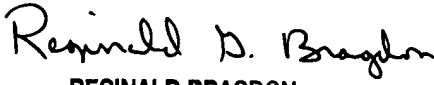
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaushikkumar Patel whose telephone number is 571-272-5536. The examiner can normally be reached on 8.00 am - 4.30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


kmp

Kaushikkumar Patel
Examiner
Art Unit 2188


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